

NORTHERN PLAINS DROUGHT ASSESSMENT

Purpose of the Assessment

The 2017 Northern Plains drought was a rapid-onset, catastrophic event for northeast Montana, the Dakotas, and the Canadian Prairies in the spring and summer of 2017. The unique circumstances of this drought created an opportunity to evaluate and improve the efficacy of drought-related coordination and management within the Missouri River Basin Drought Early Warning System.



Photo: BIA

Drought Evolution

- Abnormally-warm conditions in the fall of 2016 lengthened the growing season and increased the depletion of soil moisture. Fall is typically a time when vegetation growth has ended and soil moisture is conserved or gained with rainfall.
- A warm February caused the early melt of snowpack, so moisture was unavailable as soils warmed later in the spring season.
- Warmer-than-average temperatures continued into the spring and unusually persistent winds increased evapotranspiration.
- April and May rainfall was much below average, which is a critical stage for pasture, rangelands, foraging, and both winter and spring wheat.

Impacts

- Early impacts were noted in the agricultural sector and impacts persisted for the duration of the 2017 drought.
- Cool-season grass species, which dominate much of the region, suffered from the lack of spring precipitation. The subsequent reduction in grass production for grazing in May led to a decline in pasture and range conditions.
 - Lower grass production for grazing forced ranchers to significantly reduce their herds by selling cattle early in May and June.
 - Stock ponds for livestock water supply were depleted and surface water samples showed signs of poor water quality (containing salts and total dissolved solids).
 - Livestock perished or exhibited poisoning symptoms due to poor water quality across the region.
- Poorly-performing crops and a shortage of pasture and forage led producers to harvest crops for feed.
- Some spring planted crops failed to germinate resulting in a total loss.
- Despite near-normal stream flows for the entire 2017 season, water supply to rural water providers was reduced in some areas. Rural water systems were restricted by their infrastructure and providers were not able to keep up with increased water demand, leading to water restrictions being enforced.
- Similar impacts to agriculture, livestock, and in some areas human health and domestic water supplies, were reported from Native American Tribes in the region.
- Agriculture in the southern Saskatchewan Prairies experienced poor spring germination, stunted crop development, heat stress, accelerated crop maturity, poor grain fill, below-normal yields, water supply shortages, poor pasture conditions, feed shortages, and wildfires. Livestock production was especially hard-hit due to the widespread scarcity of feed and water.

Photo:
Laura Edwards

NORTHERN PLAINS DROUGHT ASSESSMENT

Impacts Continued

- Abnormally-dry conditions in July and August, combined with abnormally-high temperatures, contributed to near-record levels of severely low fuel moisture in the region's forests. These conditions caused large wildfires with erratic behavior and rapid growth.

Acres burned across the Northern Plains:

1,366,498
Montana

19,841
North Dakota

79,427
South Dakota

1,606,441+
Alberta + Saskatchewan + Manitoba



Photo: BLM

Response

- Montana, North Dakota, and South Dakota activated their state drought task forces. These multi-agency groups consider drought conditions, review impacts, and facilitate drought relief. State response varied depending on impacts, resource availability, and the authority of each state task force.
- Impact reports, local climate, and hydrological data was collected. A diverse group of partners provided input to the US Drought Monitor.
- A “fast track” USDA Secretarial Drought Declaration policy came into play when drought was elevated to D3 and higher on the US Drought Monitor; programs such as Livestock Forage Program, Livestock Indemnity Program, Small Business Loan assistance, cost-share for infrastructure, and others were also available through USDA.
- NOAA responded to information needs by working with the High Plains Regional Climate Center to provide pertinent data, impact, and outlook briefings, and also by hosting regional monthly webinars focused on agriculture, tribal lands, and ecosystems.

Lessons Learned

- Continued monitoring and early awareness of potential drought conditions is important for regional climatologists as well as state and federal agencies.
- Soil moisture conditions can change quickly, and soil moisture monitoring is a critical indicator in this dryland agriculture environment.
- Snowpack on the plains is important for early spring moisture. An “open” winter, or early melt, is detrimental to spring grass and wheat growth.
- There is a need to improve the understanding of the annual decision cycles of stakeholders to determine effective information delivery (grazing livestock, crops, ecosystem, water supply, etc.)
- There is a need to communicate to policy-makers and the public the value of improved data collection and evaluation of drought metrics and indicators within the High Plains Region.
- Ongoing communication and coordination within and among states, provinces, and countries is essential. The partnerships built in non-drought periods are critical.
- Reporting of year-round drought impacts needs to be encouraged. Impact reports can serve as alerts for climate and hydrological indicators and can reveal areas lacking in data.



Photos: (left) Laura Edwards,
(right) Wade Jones



For more information, please contact:

Laura Edwards | laura.edwards@sdstate.edu
Kelsey Jencso | kelsey.jencso@umontana.edu
Britt Parker | britt.parker@noaa.gov